

## CLAIMS

I claim:

- 1        1.    A vacuum lumber drying kiln for drying a stack of  
2 lumber, comprising:
  - 3        a planar base having at least one ledge including a front  
4 ledge;
  - 5        a flexible cover having a sealing base end and covering the  
6 stack of lumber forming a kiln;
  - 7        said sealing base end being sealed to said planar base at  
8 said at least at least one edge;
  - 9        means for supplying heat to said kiln; and
  - 10       a vacuum pump fluidly connected with said flexible cover;
  - 11       said flexible cover being supported by said stack of lumber  
12 such that said sealing base end seals against said base upon  
13 activation of said vacuum pump, thereby creating a vacuum within  
14 the drying chamber formed by said flexible cover and said planar  
15 base.

1           2. The vacuum kiln of claim 1, further comprising a back  
2 wall and opposing end walls, said flexible cover being attached  
3 to said back wall and extending around the upper and front  
4 periphery of said end walls, said sealing base extending to said  
5 planar base at said front ledge, said flexible cover sealing  
6 against said back wall, said end walls and said front ledge upon  
7 activation of said vacuum pump, thereby creating a vacuum within  
8 the drying chamber formed by said flexible cover, said back wall,  
9 said side walls, and said planar base.

1           3. The vacuum kiln of claim 2, further comprising a heater  
2 having an air intake and a kiln supply conduit, said kiln supply  
3 conduit being operatively connected with at least one of said  
4 side walls for supplying heated air to said drying chamber formed  
5 by said walls, flexible cover, and planar base, said vacuum pump  
6 having a greater flow capacity than said kiln supply conduit so  
7 as to maintain said drying chamber in a vacuum condition.

1           4.     The vacuum kiln of claim 3, further comprising  
2 perforated inner walls conforming to and spaced inward from said  
3 side walls, said side walls and said perforated inner walls  
4 defining at least one plenum therebetween for even distribution  
5 of heated air from said air heater to the drying chamber formed  
6 by said perforated walls, flexible cover, and planar base.

1           5.     The vacuum kiln of claim 4, further comprising a fan  
2 support wall spaced inward from said back wall forming a rear  
3 chamber and a supporting plurality of ducted fans, said fan  
4 support wall supporting said ducts and said fans for drawing air  
5 and steam from said drying chamber and exhausting said air and  
6 steam into said rear chamber for removal by said vacuum pump.

1           6.     The vacuum kiln of claim 5, wherein there is a plenum  
2 formed between each opposing wall and the respective perforated  
3 wall and said ducts are sealed to said fan support wall making  
4 said rear chamber a connecting chamber between said plenums for  
5 fluid communication therebetween.

1           7.     The vacuum kiln of claim 6, further comprising a  
2 manifold attached between said rear wall and said vacuum pump and  
3 in fluid communication therewith for removing said air and steam  
4 from said kiln to the atmosphere.

1        8. The vacuum kiln of claim 7, wherein said lumber stack is  
2 separated into layers by stickers having ridges thereon for  
3 providing circulation of air and steam between said layers of  
4 lumber.

1        9. The vacuum kiln of claim 8, further comprising a  
2 plurality of spacing and circulation tubes having open ends and  
3 slotted inner sides, said spacing and circulation tubes being  
4 located along the front of said lumber stack between each layer  
5 of lumber, said slotted inner sides facing inward into the stack  
6 such that air and steam may flow between spaces between the  
7 lumber layers partitioned by said stickers.

1        10. The vacuum kiln of claim 9, said planar base being a  
2 heating base connected with a source of heat.

1        11. The vacuum kiln of claim 2, further comprising heating  
2 plates located between each respective layer of lumber in said  
3 stack of lumber.

1           12. The vacuum kiln of claim 11, said heating plates being  
2 heated by hot water flowing therethrough and further comprising a  
3 water heater, a hot water supply conduit fluidly connected  
4 between said water heater and an upper heating plate, a water  
5 return conduit connected between a lower heating plate and said  
6 water heater, and intermediate plate to plate conduits connecting  
7 each respective heating plate in turn, whereby water circulates  
8 between said water heater where it is heated, said upper heating  
9 plate, said intermediate plates, and said lower plate where heat  
10 is transferred to the layers of lumber, and back to said water  
11 heater for heating.

1           13. The vacuum kiln of claim 12, wherein said heated base  
2 has a hot water conduit therein and said means for heating said  
3 base are said water heater, a hot water supply conduit connected  
4 between said water heater and said hot water conduit, and a water  
5 return conduit connected between said hot water conduit and said  
6 water heater.

1           14. The vacuum kiln of claim 12, wherein said heating  
2 plates are electrically heated.

1        15.    The vacuum kiln of claim 12, wherein said heating  
2 plates are hollow and have perforated upper and lower surfaces,  
3 said vacuum kiln further comprising an air heater having an air  
4 supply, an air inlet conduit, and a manifold having plate air  
5 supply conduits connect to said heating plates, respectively.

1        16.    The vacuum kiln of claim 12, said planar base being a  
2 heating base connected with a source of heat.

1        17.    The vacuum kiln of claim 11, said flexible cover  
2 covering the stack of wood on all four sides, i.e., the back,  
3 each end, and the front side, said planar base having four sides  
4 serving as ledges for sealing against the cover base end of said  
5 flexible cover, said flexible cover being of such height relative  
6 to said stack of wood as to exact atmospheric pressure upon the  
7 top lumber layer of the stack upon pulling a vacuum on said kiln.

1        18. A method of drying a stack of lumber comprising:  
2        placing a stack of wood on a kiln base;  
3        placing a flexible cover over said stack of lumber and  
4        sealing said flexible cover to said kiln base;  
5        pulling a vacuum on said flexible cover as sealed to said  
6        kiln base;  
7        providing heat to said kiln while drying said wood;  
8        wherein said flexible cover transmits atmospheric pressure  
9        to the upper layer of said stack of lumber upon the pulling of  
10       said vacuum, thereby maintaining the lumber in a straight,  
11       uncupped condition during drying.

1       19. The method of claim 18, wherein said heat is provided  
2       by hot plates distributed between layers of said lumber in said  
3       stack, thereby providing heat to said lumber by direct contact  
4       and conduction from said hot plates.

1       20. The method of claim 18, wherein heated air is provided  
2       to said stack of lumber, as separated by stickers, said heated  
3       air and steam from the lumber being recirculated through said  
4       stack of lumber during the drying process.